GWANDA STATE UNIVERSITY

FACULTY OF NATURAL RESOURCES MANAGEMENT AND AGRICULTURE

DEPARTMENT OF HORTICULTURE AND CROP PRODUCTION

PROGRAMME: BSc HONOURS HORTICULTURE & CROP PRODUCTION/ANIMAL PRODUCTION AND HEALTH

NHC2205: FARM MACHINERY AND STRUCTURES

FINAL EXAMINATION

JUNE 2025

This examination paper consists of 3 pages.

Time Allowed:	3 Hours
Total Marks:	100
Special Requirements:	Scientific calculator (supplied by student)
Examiner's Name:	Madzaramba T.H

Instructions

1. Answer **ALL** questions in Section A
2. Answer any **THREE (3)** questions in Section B

Mark allocation

Question	**Marks**
Section A	40
Section B	60
Total attainable marks	100

SECTION A: Answer **ALL** questions.

Question 1

a) Define the following terms:

i. Effective operating time [2]

ii. Farm mechanisation [2]

iii. Theoretical field capacity [2]

iv. Power performance [2]

v. Precision planting [2]

b) List **five (5)** disadvantages of a standard disc plough [10]

c) Outline the calibration of a manual maize planter using the field method. [10]

d) A soyabean planter with 12 furrow openers at 25cm spacing will be calibrated to achieve the desired seed rate for sowing soyabeans. The radius for the drive wheels is 60cm. Determine the seeding rate per hectare if the seed collected after 150 revolutions of the drive wheel is 10kg. There is no positive slippage. [10]

[40]

SECTION B: Answer THREE questions.

Question 2

a) Determine the nozzle flow rate for a boom sprayer with nozzles spaced at 105.8 cm if the travel speed is 6.6 km/hr and the desired application rate is 238 l/ha. **[10]**

b) Briefly describe **five (5)** benefits of farm mechanisation. **[10]**

Question 3

a) Decode this nozzle code **F/80/1.2/3** **[5]**

b) Discuss the role of emerging technologies such as drones and artificial intelligence (AI) in agricultural production. **[15]**

Question 4

a) Outline five (5) causes of disc choking in disc harrows **[5]**

b) A farmer intends to plough 150 ha of land in 10 days, working 10 hours per day. The estimated field efficiency is 75%, and the tractor working speed is 6.5 km/hr.

Calculate:

i. Total working time in hours **[2]**

ii. Actual field capacity **[3]**

iii. Theoretical field capacity **[3]**

iv. Average effective width of plough to be used. **[3]**

v. Drawbar power if soil draft is 375N/m/cm, plough depth is 10cm. **[4]**

Question 5

a) Copy and complete the table below:

Classification	Implement
Pull type (Trailed)	
Semi-mounted	
Fully-Mounted	
Self-propelled	

[8]

b) Enumerate **four (4)** factors that you should consider when choosing a site for a poultry unit for 50,000 birds in Matabeleland South **[12]**

Question 6

a) State the functions of the following parts of a spinning disc fertiliser spreader

i. Hopper **[2]**

ii. Agitator **[2]**

iii. Adjustable collar **[2]**

iv. Disc **[2]**

b) Name and describe **four (4)** components of a herringbone milking machine **[12]**

END OF QUESTION PAPER!!!